REMARKS/ARGUMENTS

Favorable reconsideration of the present application is respectfully requested.

Claims 16 and 17 have been canceled, and Claim 1 has been amended to incorporate features based upon those of canceled Claim 16, i.e., that the stem is a dual stem, wherein the pitch sensing device is disposed in or on the exterior section which remains stationary during use. Claims 4-8 have also been canceled.

The present invention is directed to a pitch sensor tool for a boring or drilling machine having a stem and a drilling head. It is sometimes necessary to drill bores at a certain pitch relative to the horizontal, and so it is necessary to detect the current pitch at any given instant during the boring process. According to a feature of the invention, this is made possible by use of a dual stem boring or drilling machine, wherein the pitch sensing device is disposed in or on the exterior section of a housing coupled to the dual stem, wherein the exterior section remains stationary while the interior section may rotate during use. An example of this is illustrated in Figure 2 of the specification.

Claim 1 was rejected under 35 U.S.C. §102 as being anticipated by U.S. patent 5,320,180 (Ruley et al.). On the other hand, paragraph 8 of the Office Action indicates that Ruley et al. does not disclose the feature in original Claim 16 of a dual stem with the pitch sensing device being mounted on the non-rotating outer section of the pitch sensing tool. The Office Action therefore has additionally relied, for rejecting Claim 16, upon U.S. patent 6,179,066 (Nasr et al.) which allegedly "teaches a dual stem comprising inner and outer sections with the pitch sensing device being mounted on the non-rotating outer section of the pitch sensing tool." According to the Office Action, it would have been obvious in view of Nasr et al. for one skilled in the art to use a dual stem as in Ruley et al., wherein the pitch sensing device is mounted on a non-rotating outer section of a pitch sensing tool. It is

nonetheless respectfully submitted that the claims define over any combination of the prior art, including Ruley et al. and Nasr et al.

Ruley et al. is directed to a dual antenna radio frequency locating apparatus and method used in making river crossings and the like. A horizontal drilling rig is set up and drills under a body of water or the like. Angular measurement sensors are carried at the drill bit and provide data periodically, which data is transmitted from a transmitter at the end of the drill string. A dip sensor 34 provides a measurement of a dip angle with respect to a gravity defined coordinate system (see Figure 3).

However, as has been recognized in the Office Action, Ruley et al. fails to disclose or suggest a pitch sensor tool for a dual stem boring or drilling machine, the tool having an exterior section adapted to be coupled to the outer stem and including a compartment for housing a pitch sensing device, and an interior section adapted to be coupled to the inner stem of the dual stem, in which the exterior section is maintained in a non-rotating state while the inner stem is driving a drill bit. Nor would Nasr et al. motivate one skilled in the art to modify Ruley et al. to provide the pitch sensing device at such a location.

Nasr et al. is directed to a stabilization system for stabilizing drill bits against vibrations. Such stabilizers are typically pads that extend outward from the drilling assembly and contact the bore hole to minimize vibrations (column 1, line 48 through column 2, line 2). In one embodiment (Figure 4), the pads 264 with sensors 301 of the vibration stabilizers are attached to a non-rotating sleeve 262.

It may therefore be appreciated that Nasr et al. would not suggest providing a pitch sensing device on a non-rotating exterior section of the drill stem in Ruley et al. The sensor 264 of Nasr et al. is not a pitch sensor but is instead a vibration stabilizing device having contact sensors 301. The contact sensors are moved into contact with the walls of the bore hole (column 7, lines 43-44), and so Nasr et al. only suggests providing *contact* sensors on a

non-rotating part. Nasr et al. might therefore suggest modifying Ruley et al. to include a non-rotating part provided with *contact* sensors for a vibration stabilizing system. However, this would not additionally teach that the *dip* sensor 34 of Ruley et al. should be located on such a non-rotating sleeve. Accordingly, the amended claims define over any obvious combination of the above references.

Claim 3 further recites that the pitch sensing device is mounted within a compartment within the pitch sensing tool. Needless to say, this would not have been rendered obvious by Ruley et al. in view of Nasr et al. Nasr et al. mounts *contact* sensors 301 on a non-rotating part. The contact sensors 301 must inherently be mounted exterior to the stem of the boring or drilling machine in order to contact the wall of the bore hole. As such, they cannot be mounted within a compartment within a pitch sensing tool.

Claim 15 has been amended responsive to paragraph 1 of the Office Action.

Applicant therefore believes that the present application is in a condition for allowance and respectfully solicit an early notice of allowability.

Respectfully submitted,

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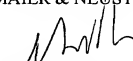

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